

Introduction

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Introduction

Pascal Petit and Luc Soete

1. EMPLOYMENT IN EUROPE: THE FACTS AND THE DEBATES

Over the last decades, technology has come to be regarded as a major force behind international competitiveness, growth and employment creation. At the same time it has also emerged as a central concern behind the rapid rise in unemployment in the late 1970s and 1980s and the persistence of such high unemployment rates in Europe. The rapid introduction of new technologies, spurred by Europe's own integration process and the broader globalization process, has often been singled out as one of the main factors behind widespread employment displacement and job losses. At the aggregate level such employment displacement obviously becomes much more visible in periods of sluggish growth and recession; at the sectoral level it will often be concentrated in particular industries; at the individual job level it will affect some workers with particular routine skills much more than others. New technologies have also been held responsible for increased wage and income disparities and work insecurity more generally. No single country seems to have escaped these pressures, even though some have been much more successful in coping with them than others.

Yet the concerns about the employment and distributional implications of contemporary technological change, as has been emphasized by many economists over the centuries, are not really based on any historical precedents. Concerns about so-called *technological* unemployment have a long track record, predating even the Industrial Revolution. In general terms, it could be argued that those predicting the employment implications of a particular set of technologies have systematically tended to overestimate the visible, direct employment displacement effects of the substitution of labour for capital and to underestimate the various indirect employment compensation effects which are likely to operate in the economy at large and in the longer run. In many ways, this analytical bias towards employment displacement is part of the much wider tendency to assess a particular new technology first and foremost in terms of what it now can do more efficiently and better. Ultimately, this

was of course the aim of the research of the inventor. This inventor's bias is often reflected in the first, original name given to the particular new technology: the radio or 'wireless' replacing the wired telegraph; the car replacing the horse and cart ... or even today the notion of 'electronic commerce' conveying the impression of replacing first and foremost 'physical' commerce. As many economists, particularly in the crisis years of the 1930s or 1980s illustrated, it is particularly difficult not to come up with significant employment displacement results if account is only taken of these substitution effects, the price and income elasticities being generally too low to bring about such output growth to offset the productivity gains realized thanks to the new technology. It is indeed as difficult for the economist as for the technologist to imagine and estimate the employment impact of possible new applications of the technology in areas far removed from the original technology and bringing about new growth and demand.

From this perspective, the early postwar decades of fast economic growth and strong productivity gains leading to a rapid return, after the end of World War II, to full employment in the 1950s and 1960s, with a more or less perfect institutional mix between the distribution of the gains in productivity into higher wages and a large and widespread unsatisfied demand for standard, homogeneous goods, were rather more an exception than the rule. While such advances helped to clear the suspicion associating technological change with unemployment, they also gave full credit to analyses where output compensation effects depending on price and income elasticities, as well as indirect employment creation effects in the new capital goods-producing sector, and possible substitution effects following wage adjustments, would practically automatically result in full compensation of the initial destruction of jobs and might even have positive net effects.

As a result, the dominant set of economic arguments put forward in the early 1980s, when the employment crisis became visible in practically all OECD countries, emphasized in particular the imperfections in labour and capital markets to explain the fact that compensation effects did not materialize and that various forms of 'technological unemployment' became apparent. Practically by definition, such illustrations of structural unemployment became translated into market frictions: thus the notion of a 'natural' rate of unemployment or of the non-accelerating rate of unemployment (NAIRU) became popular. This view was undoubtedly also the one most clearly reflected in many of the official and less official European and OECD studies carried out in the late 1980s and culminating in the 1994 OECD Jobs Study, which most explicitly blamed the over-regulation of European labour markets as being at the core of the European unemployment problem. The successful activation of labour market policies as introduced in a number of European countries, with in some cases significant reductions in unemployment rates

(with Denmark and the Netherlands as the most evident cases), undoubtedly lends strong support to this view. The monitoring of individual European countries' employment policies, as proposed at the Luxembourg summit in 1997, and since then part of an annual evaluation procedure by the European Commission, highlights further the broad current policy consensus on Europe's failure to generate sufficient new employment opportunities.

The approach chosen in this book, however, is a different one. As early as the mid-1970s, in response to the then standard Keynesian view, as most explicitly expressed in the OECD McCracken report, that the oil shock-induced crisis was a temporary phenomenon, a number of economists, including both the present writers (Soete, 1987; Clark *et al.*, 1982; Petit, 1986) emphasized the underlying structural nature of the emerging employment crisis, associated with a different path of technological accumulation and growth. We continue to do so. By focusing on the many structural features of technological change, we will thus depart sometimes from the standard market equilibrium view, to insist on the many underlying learning processes that are associated with a number of new structural changes associated with technological change. These learning processes are rarely smooth and easy. They will involve various coordination problems: how to bring about changes on the shop floor, at the organization level of production and distribution, at the level of consumers' willingness to adjust habits and (re)learn, at the institutional level – all in a mutually reinforcing, synergetic way?

From this perspective, the widespread slowdown of productivity gains over the 1980s and 1990s is for the standard economists maybe a 'paradoxical' phenomenon, often used, at least until recently, to play down the significance of the technological transformation. In our view it is rather a plausible, historically analysed phenomenon. Thus, rather than denoting a slowing down of technical progress or a lack of innovations, as many standard neoclassical growth analyses were claiming as recently as the late 1980s (see, among others, Englander and Mittelstadt, 1988),¹ such a trend appears in our view more indicative of the pervasiveness and diversity of the many mismatches between different learning processes: of agents, of organizations and of institutions. These mismatches can even be found reflected within the economic profession itself, with a burgeoning amount of detailed, micro-based studies, highlighting the many success stories of firms or sets of firms having used new information and communication technologies in productive ways (see, for example, the Washington Conference of the Department of Commerce, March 1999), yet with very little macroeconomic evidence, with the notable exception of the US computer industry (Gordon, 1999), to put forward.

In Table 1 we try in a very approximate and crude fashion to summarize the changes in the perception of the relation between employment and technology. The table highlights how, in the 1980s and 1990s, the lack of a clear,

Table 1 *Technical change and employment: a reversed relationship?*

	Technical change	Productivity	Growth	Employment
1950s and 1960s	+	+	+	+
1980s and 1990s	+	?	?	?
Question		Paradox of productivity slowdown	Measures in real terms	Arbitrage between unemployment and 'poor workers'

positive relationship between technical change and productivity, the productivity paradox discussed above, is part of a broader set of questions with respect to the relationship of technology and growth and the increasing measurement problems of output, particularly in some of the most rapidly growing new service sectors. The unclear relationship between technical change and employment creation can then be viewed in part at least as depending on a trade-off between downward wage adjustment and the creation of low wage employment which can be characterized as the working poor, or a growth in unemployment as a result of the elimination of routine jobs.

On the surface, Europe, at least in aggregate terms, appears to have followed this second line and the USA the first. The contrast between the European and US experience over the last decade is indeed particularly striking. The USA experienced in the 1990s a surprisingly long economic upswing, unemployment today is at a record low level and a high volume of employment has been and continues to be created every year. Japan, which was the growth and employment success story, very much reflecting the 1950s and 1960s set of positive relationships indicated in Table 1, has now experienced slow growth for over a decade and is facing the problem of unemployment, with registered unemployment approaching 5 per cent in 1999: a totally new problem for a country which enjoyed 'natural' full employment for four decades.

There are of course many reasons which might be invoked to explain these diverging trends over the last decade amongst the so-called 'triad countries'. In this book, as argued above, we focus first and foremost on technology (and the technical and organizational knowledge that goes with it): the most important, if not unique, factor in explaining long-term growth. From the technology perspective, the growth divergence amongst the USA, Europe and Japan in the 1990s appears, at least at first sight, paradoxical, given the increased international access to and diffusion of technology. Most politicians, businessmen, technology experts and economists, whether of US,

European or Japanese origin, have very similar expectations with respect to the long-term growth and employment creation potential of new technologies, particularly information and communication technologies (ICTs). These expectations are built at least partly on the historical record of the overall positive employment impact of previous waves of technological change in the postwar period, as we saw before, and partly on the special features of current ICTs.

Three such features appear of particular relevance today: the dramatic decline in the price of information processing, the convergence between communication and computer technology, and the rapid growth in international electronic networking, all of which are likely to boost innovation in organization, in changing market practices and in transforming work. While different concepts or terms are still used in each country ('electronic highways', the 'knowledge-based economy', the 'global information society'), they all point to a rapid increase in the information and knowledge base of the economy closely associated with electronic networking. The more pessimistic or sceptical views stress rather the problems involved in using these new technologies: problems of organization, of security, of privacy, of taxation, of (intellectual) property that may all, in one way or another, block or delay the growth and expansion of these new uses and activities (see Litan and Niskanen, 1998). In general, the debate ends up in some vague consensus among policy makers, businessmen and academics that there is a potential to reap but that severe traps or deadlocks (or 'lock-in') must be avoided. Here, though, comes the real dividing line between those who believe that such caveats can only be met by 'free' market forces and those who believe that the challenges imply some policy interventions and adequate institutional changes.

From this perspective the comparison between Europe's poor experience and the successful US experience is particularly revealing. Free marketeers praise this example as the proof that no intervention is the rule to follow to take advantage of ICTs. They argue that Hayek's argument that the world is too complex for policy makers to do anything else than messing around in a counter-productive way is more valid than ever, precisely because of the very decentralized and pervasive nature of the new technologies. Interventionists, on the contrary, stress that the US example illustrates rather the opposite. The US economy, or more exactly its ICT sector, continues to enjoy a rent on innovation as leader in an area where the US government and administration have been quite active (large military programmes, spillovers from military networks, semiconductor trade agreements, inspirers of codes of conducts and of intellectual property rights, and so on). Secondly, and more importantly, US growth has been accompanied, at least as revealed by aggregate indicators, by an impoverishment of part of society, to an extent which might

question the long-term outcome of the US growth pattern. This debate over the 'dualist' potential of ICTs is all the more relevant since it reflects a general trend in all OECD countries, with the USA being the 'worst practice', most affected case so far.

This more or less sets the scene for the issues addressed in this book. What is the potential of the so-called 'new' technologies, particularly ICTs? What various patterns of growth and employment creation, and what sort of employment can countries expect to be created following the introduction of these new technologies? How should firms behave to adjust to more favourable production and distribution patterns? How should policy makers? How far does one rely on national intervention, or regional policy action? Or does one respond only to global actions?

Of course this book does not pretend to produce all the answers to questions which are in our view still very dependent on the course of action that will be taken at all the levels previously mentioned. But the book seeks to show how to address the questions at each stage, how to disentangle experiences of countries from their specific institutional 'path' advantages and disadvantages. It is very telling in that respect to look at common changes and we stress in that regard the common interrelated structural changes that are specific to the historical phase that developed economies are currently facing. Secondly, we underline the strong sectoral dimension of the problem, because of the role of services both as a pole of employment and as a central logistics base for the new network economy. But the changes have also strong organizational dimensions which concern the firms and the way they articulate reorganization of the workplace and market links. Finally, we shall also address the questions of the institutional context in which these organizational issues and policy choices are being raised.

We now focus in more detail on each of the four sets of structural change issues along the lines of the four parts into which this book is divided, namely aggregate structural change at the world level, sectoral changes, organizational changes and, finally, institutional changes.

2. CONTEMPORARY STRUCTURAL CHANGE AT THE WORLD LEVEL

We start Part I of this book with Freeman's chapter, which compares the dynamics of growth and employment in the triad countries, and underlines the impact on growth patterns by the financial sector. Freeman compares Europe as a whole with the USA and Japan, and asks whether specificities of service industries in Europe account for its lagging behind in the triad. His analysis underscores the fact that large differentials in the rate of technical change

across sectors have led to a wide dispersion in growth, price and quality trends across sectors with, as a consequence, continuous structural shifts in the demand and supply of old and new commodities. The shifts in employment in practically all European economies from agriculture and manufacturing to services, the latter sector employing today some two-thirds of total employment, are a striking illustration of such differential impact. However, Europe, the USA and Japan have experienced rather different trends within this broad development framework (trends which are surveyed in Chapter 3).

The USA seems to have a pre-eminent position with regard to the mastering and diffusion of new technologies, but also in terms of international outreach and business service logistics, all of which appear to have contributed to restoring its hegemonic position. Conversely, Japan and Europe are in positions differing on many grounds, which cannot be easily interpreted in simple terms of catching up. Japan is slowly recovering from the challenge represented by the reorganization of its own system of production under the pressure of internationalization and tertiarization, while Europe, less different as a whole from the USA, may be too hampered by its internal diversity and difficulties to take advantage of the scale and scope economies that should be brought about by the Union, particularly in knowledge-based activities and services.

Freeman, in his contribution to this volume, insists on the specific roles of leaders and followers in this process, as well as on the complexity of the catching-up process. The recent crisis in East Asia is cited as an example of such complexity, resulting from a specific feature of the present phase of tertiarization, the role of financial institutions. If the finance industries play a key role in monitoring the high levels of risks of the present worldwide diffusion of technologies, then countries developing in all areas but with a weak financial sector (of which Japan seems to have given a good example) are effectively running extraordinary risks bound to be fatal at some stage. Furthermore, even the leader country can be forced by competition from followers to engage in risky activities. The actual level of risk associated with a new economy, which has many of the hallmarks of a bubble economy, makes it all the more compulsory to have a central coordination of macroeconomic policies, acting as a G7 lender of last resort to rescue the world economy from systemic crises.

Because services are, by their development and history, very much country-specific, the emergence of a new growth regime is marked by national specificities, although one might have expected the opposite in times of increased internationalization. In fact, there will be both factors of international differentiation and factors of international harmonization in the strong structural changes that are manifested by the globalization and the tertiarization trends depicted above.

The dynamics of employment will then depend on two central issues: first, how firms will organize work internally, and, second, how welfare policies and local customs will influence the participation rates that remain so widely different in most of Europe and in the triad. These two issues will be of central importance in the next two sections of the present chapter. Regarding participation rates, the low level of the employment content of economic growth in most European countries is significantly linked with their relatively low employment ratios (percentages of large age groups, such as 25–55, in the labour force, are on average lower than in the USA or in Japan).

This points to a major characteristic of Europe as being a zone where people work less, both because there are more unemployed and because their levels of activity are low. The reasons for low levels of activity are relatively straightforward, however. On the one hand, the pursuit of studies tends to last longer for men and women alike, and, on the other hand, Europeans enjoy a much earlier retirement age. On top of that, one could point to longer holidays than in the USA or Japan. Some try to stress the bleak side of these figures, arguing that earlier retirement is due to a lack of jobs, as is the later entrance into the active population. This, however, may be looked upon as a transitory phenomenon linked with the mass unemployment rates of the 1980s. Others may look at it in a more positive way, as a voluntary choice in favour of a certain quality of life. However, low participation represents (as Mjøset argues in Chapter 15 of this volume) a welfare state luxury. Either it is wanted and perceived as a priority or it becomes increasingly unbearable and undermines the whole welfare fabric of European society. Increased participation, in so far as it monetizes non-economic activities, represents a double dividend advantage to Europe's sophisticated welfare states: fewer people to cater for and more social revenues.

The relative weight of consumption and leisure in our highly developed economies has, however to be kept in mind on at least two grounds. First, it is a favourable condition, if not an opportunity, when questions of education and training are raised, as it presents advantages in terms of lifelong learning, alternative schemes of formal and on-the-job training and other themes which are recurrent in the basic requirements of a new economy. Second, it opens up opportunities for the organization of service activities, at a time when user–producer relationships are becoming more intense.

These issues will have to be borne in mind when considering the outcomes of the choices of firms regarding their internal organization of work, or the perspectives given to welfare policies. Having stressed that the new role of services will go hand in hand with the modernization of the other activities in a new mix, where both relations between firms and work organization within firms will have been thoroughly revised, we turn towards the key issue of work organization.

3. SECTORAL GROWTH PATTERNS AND THE DYNAMICS OF EMPLOYMENT

Manufacturing has long been considered as the engine of growth, because of its capacity to organize and restructure production in ways allowing steady productivity gains (see, for example, Cornwall, 1977, and Fagerberg and Verspagen, 1999, for a more recent empirical assessment). Static and dynamic economies of scale, such as replication on a larger scale of production processes, or dynamic learning effects from cumulated experience and incremental innovation, have been the way to sustain this process. This went together with the old classical Smithian principle that large markets allow for a more extensive division of labour. Young (1928) insisted on the fact that such division occurred both within firms and between firms, that it stimulated (incremental) technological change, which in turn stimulated demand so that economic growth propagated itself in cumulative ways. This was also basically the mechanism referred to by Kaldor and later post-Keynesian scholars when putting forward the notion of manufacturing as an engine of growth (see McCombie and Thirlwall, 1994).

Fagerberg and Verspagen (1999) conclude that the role of manufacturing in overall growth of the developed countries has declined over the last decades, while it remained strong in some of the newly industrializing countries. In light of the discussion in the previous section, which stresses the increasing role of services as suppliers of high-quality inputs into the manufacturing process and other parts of the economy, one might be tempted to ask whether (business) services can be the new engine of growth for the whole economy. The industrialized economies have effectively experienced a significant shift away from manufacturing to services, as the increasing shares of the latter in nominal gross domestic product (GDP) and in employment show. Still, the general slowdown in productivity and in output growth does not allow one to interpret this shift towards services (as yet) as the source of a new engine of growth. Moreover, the forces underlying these sectoral trends remain a matter for debate (for example, see Pianta's contribution in Chapter 5 of this volume, as well as von Tunzelmann and Efendioglu in Chapter 2).

There are two sides from which one may look at the shift from manufacturing towards services: deindustrialization or tertiarization. Landesmann and Stehrer in Chapter 7 show that a sizeable group of continental European countries displayed a significant speeding-up of the deindustrialization process during the mid-1980s and early 1990s, a move that did not show up in the UK or in the non-European OECD economies. In addition, a majority of European countries experienced a sharp slowdown in the rate of employment absorption in the community and social services sector (the sector with the largest employment share), which contrasts with the high employment rates

of this sector in continental Europe over the period 1975–85.² Thus, according to this interpretation, changes in rates of unemployment in Europe could be explained mainly by the lagged deindustrialization of most continental countries (completed earlier in the UK and the USA, and more recently in the Netherlands) and by a slowdown in the growth of employment in welfare services. Overall, these results point to a process of adjustment of the dynamics of employment of continental Europe to the dynamics observed in other OECD countries. This adjustment concerns changes in the strategies of both manufacturing firms and welfare policies. More than a process driven by the expansion of services, it manifests itself in a reduction of the room for manoeuvre of continental European countries, or in a convergence of continental Europe to global trends.

However, the process of deindustrialization may be overrated because in fact what has happened is a growing outsourcing of tertiary tasks. To check this effect, Schetkatt and Russo in their contribution to this volume (Chapter 4) implemented the concept of vertically integrated product sectors (which in fact corresponds to aggregating all the stages of production into the lines of final products), by using an internationally comparable input–output (I/O) database. Their analysis decomposes the changes in output into several effects, of which the first quantifies shifts in the final demand structure of the economy. In this respect, a shift towards services industries is most pronounced in final household consumption, partly compensated by reverse trends in exports. This effect turns out to be rather sizeable, but other variables are important as well. Outsourcing does appear to have gained in importance over the period of the 1980s and early 1990s examined, and contributed to the shift towards services industries. However, it amounted to only a minor part of the overall shift. Moreover, there are some important and surprising differences between countries when looking at the shares of intermediate inputs of services (relative to gross output). Overall, the conclusion from this analysis of I/O statistics is that technological developments, rather than shifts in the inter-industry division of labour, drive productivity increases.

What this points to is that a simple ‘accounting’ approach to the process of tertiarization and the growth of business services does not suffice. Beyond the real problem of measurement of these services activities (for example, see Griliches, 1994) it seems that their impact has to be analysed in terms of a ‘deeper’ level of technology and organizational dynamics.

4. SKILL AND WORK ORGANIZATION ISSUES

Technical change, that is, the emergence of ICTs, as well as the other structural changes that accompany it, have challenged the work organization of

firms. This organizational issue is crucial to understanding both the slowdown in productivity gains and the potential of a new growth regime that would rely on ICTs and on the exploitation and accumulation of knowledge that they allow. This major question of organization, which concerns consumption activities as well as production activities, has led to heated societal debates, connected to a process of trial and error, which has more than ever been left to private agents. It contrasts with previous changes in the technological system, whose implementation required public interventions to establish frameworks, norms and infrastructures. Never has such a major transformation been left to the coordination of market forces, which in addition are taking place worldwide. That is basically why organizational issues are so crucial in the appreciation of the emergence of a knowledge economy.

Debates on this issue have been linked to the demand by firms for employment that is more flexible, more skilled and more adaptable to new qualification requirements. The significance and importance of this skill-biased technical change have been the subject of numerous econometric studies, aimed at disentangling effects so closely linked as those of trade and technology. The underlying causal relationships at work have been addressed much less. This is a main reason why the great majority of the contributions to this project have focused on the complexity underlying the demand for various categories of qualifications, technological change and international competition. Theoretical modelling has been one way to track some of the effects that these organizational issues may bring to the surface. Here again, implications in terms of policy may have to be differentiated to account for the diversity in the organization principles prevailing in European countries.

In general, continuous organizational changes take the form of a move towards more 'organic' forms of workplace organization. This includes more responsibility being awarded to workers at the lower layers of the hierarchy, a more collective organization of work, more horizontal communication and a greater variety of tasks being performed by each single employee. Moreover, new forms of workplace organization tend to be associated with a high technological intensity. Technical change and organizational change go hand in hand.

With the help of studies coming from the economic literature, but also from sociology and management, Caroli in her contribution to this volume (Chapter 8) highlights some possible sequences of choices between technical and organizational change. Recent evidence regarding the spreading of information technologies and new work practices suggests that organizational changes have largely taken place in response to technological evolution. This is due to the combination of ICTs calling for, as well as permitting, new forms of workplace organization and strong organizational inertia. In a dynamic perspective, this ends up in technical change providing a crucial impulse

to organizational evolution. However, organizational change is far from being an optimal response to technical change. The implementation of new HRM (human resource management) practices heavily depends on labour–management relations and on cultural as well as institutional factors. This leads Caroli to develop a rather evolutionary approach whereby technical and organizational changes are shown to coevolve. Debates over which of the two – technological change or organizational change – determines the other then turn out to be irrelevant.

Disentangling the roles of technical and organizational changes in continuing microeconomic evolution is particularly important in the current debate about the so-called ‘skill bias’. Recent econometric studies indicate that organizational change is actually as much skill-biased as technical change. The analysis suggests that organizational changes call for more general education, whereas technological changes could be coped with by relying on specific training. In short, organizational change would be knowledge-biased, while technical change is essentially skill-biased. Not surprisingly, the room for manoeuvre left to human resources management by firms thus depends heavily on the supply of educated and skilled labour provided by the educational system and the labour market. But the balance and ability to substitute one kind of resources for another may not be the same in the new context. Interactions between the conditions of labour supply and work organization by firms have, for this reason, been central to the questions raised in most of the contributions in this book.

Gatti in Chapter 9 of this volume has taken a broad perspective in modelling how different microinstitutional conditions at the firm level would interact with various kinds of labour markets, leading to a possible explanation for differential rates of unemployment observed in Europe, Japan and the USA. The definition of these different microinstitutional conditions encompasses (a) the structure of the firm, (b) the system of vocational training, and (c) the nature of labour markets, making it possible to build a model of equilibrium rates of unemployment in an efficiency wage framework. The results of this mainly theoretical exercise point to the important role that can be played by the mode of organization of the firm and the nature of workers’ competencies in determining the rates of unemployment, as compared with the relatively minor role played by the flexibility of the labour market, so often referred to as the central cause of unemployment in Europe.

Again, this explanation does not rule out the fact that characteristics of labour supply may have a sizeable impact. In particular, tertiarization boosted by a widespread increase in the level of education of the labour force (as manifested in the average number of years spent at school or at university) is certainly a key issue in determining both the kind of work organization used by firms and the kind of labour market that will develop. Van Zon, Meijers

and Muysken focus their contribution to this volume (Chapter 10) on this issue of skill allocation. Their model investigates the influence of asymmetries in substitution possibilities between skills, but also of asymmetries in learning capabilities between workers of different skill levels. Labour demand is defined in terms of jobs, which have to be matched with the heterogeneous supply of skills. The putty-clay³ model of allocation is neoclassical in nature, except for the asymmetries mentioned above, and takes into account the relative efficiency of the labour force on the jobs (meaning that a skilled worker in a low classified job has, nevertheless, a greater efficiency).⁴ The model also describes how a 'chimney' effect allocates labour supply to meet the demand of firms.

Empirically, the model is implemented using a skill allocation model estimated for Germany and the Netherlands. The analysis suggests that 'upgrading' job requirement in the Netherlands is rather successful in the manufacturing sectors, but much less so in the tertiary sector. This implies that speaking of a skill bias would be justified in manufacturing activities, but much less in services in the Netherlands. The results are much less obvious in Germany, although results are hinting at similar phenomena. These are important qualifications in the debate over the skill bias nature of technical change, which would be worth checking for other countries. One has to keep in mind, however, that measures of relative efficiency are entirely based on wage differentials, which may also reflect a general practice of differentiating wages in favour of more educated workers, whatever their occupation is.

Following up these analyses of the effect of structural changes in the labour supply, it is important to check how the three facets of structural change affect wage formation. In that respect, the above analysis left out the issue of internationalization, while it is often claimed that increasing trade and foreign direct investment (FDI) with low-wage countries had a detrimental impact on the relative wage of low-skilled workers. De Loo and Ziesemer have in the present book precisely tried to estimate all the relative effects of trade, technical change and shifts in labour supply on employment (see Chapter 11). They also accounted for the impact of changes in interest rates conditioning investment flows. The estimation of their perfect competition model for 67 combinations of countries and sectors yields the result that technical change explains a higher percentage of both wage and employment growth than changes in the terms of trade do before the 1980s. From the 1980s onwards, international trade is slightly more influential than technical progress. Much more important than these two, however, are changes in the sector-specific labour supply in all countries but the UK (where terms of trade changes matter most).

These results (following an assumption of perfect competition but apparently robust to an assumption of increasing returns) seem to re-enforce the

idea that, over the 1980s and 1990s, which is the period we are concerned with, much of the assumed skill bias is linked with a shift in the supply of labour. It is consistent with the emphasis placed in the project on an aspect of structural change that also has major policy implications. An important issue is then to know whether the prevalence of this labour supply effect will lead to an increasing differential between wages of high- and low-skilled workers. In other words, is the growing divergence that one may observe in the USA an inevitable part of the process that European countries are going to face?

The contribution to this volume by van Zon, Sanders and Muysken (Chapter 12) suggests that there is nothing inevitable in these evolutions. Using a model similar to Krugman's North-South model of international trade, but with two sectors within one country, they show that, if technological change can be the cause of wage divergence between high-skilled and low-skilled workers, different constellations of technology and labour supply characteristics by country may induce different labour market regimes regarding the evolution of relative wages. This theoretical model recalls that countries are not 'condemned' by contemporary technological change to wage divergence and increasing income inequalities.

Summarizing the work in this area of work organization and skills, the analysis suggests on various accounts that education or, more broadly, issues of labour supply, have a major impact on employment trends. This leads us to analyse the impact of institutional change implied by the transformation of educational systems and the broader institutional context influencing the quality of the labour force and its participation rates.

5. INSTITUTIONS THAT MATTER

We have stressed above that the diversity in organization principles between sub-sectors of services or between firms is borne by the institutional variety of European countries. The previous section also insisted on the role of labour supply that hinted strongly at the institutions monitoring this supply. We also mentioned that this diversity was a real challenge for Europe as it was much more difficult to design any policy of institutional change for such a fragmented institutional fabric. However, diversity may also have some advantages in offering institutional frameworks closer to issues that have strong local links such as education, labour supply and inter-firm linkages. When new synergies are required to take full advantage of local assets, such diversity may help, although diversity does not vanish with the imperative need to adapt the old structures to the new situations.

We shall illustrate some of the problems raised through three different perspectives. One is concerned with the social organization of working time,

which is obviously a principal dimension in the organization of labour markets. A second has to do with the evolution of national systems of innovations, a field that has given way to numerous comparative analyses of institutional structures. We have taken advantage of these studies, attempting to illustrate the broad kind of challenge that lies in the provision of the proper human resources, the importance of which was stressed above. Third, we have tried to link our preoccupations on institutional matters with the question of the future of the welfare state. Not only does the welfare state influence and encompass as a general framework the systems of education and innovation which we have just mentioned, it also conditions two big issues raised earlier, namely the dynamics of social and community services, which remain a cornerstone for the dynamics of employment, and the redistributive issue in an era where divergence in wages and incomes tend to increase inequalities. Organization of working time, systems of education and innovation, and the evolution of the welfare state are not the only institutions that matter in the shaping of contemporary new growth regimes, but they are clearly the issues closest to the points made in the previous sections of this chapter.

The reorganization and the reduction of working time are currently on the policy agenda of most European countries and of the European Union as a whole. Working time, once all its dimensions are accounted for (legal full-time, all-year-long distribution of work periods, conditions of part-time work, and determinants of participation rates) is an essential indicator of welfare and of the functioning of labour markets. Not only is the total amount of working time an appropriate measure of the employment possibilities existing in a country, but per capita working time is also a measure of quality of life of its workers. It is also a central issue in the organization of services, and the use of ICTs in those activities where time is a more directly binding constraint.

Spiezia and Vivarelli in Chapter 13 draw up a balance sheet of the main changes in the patterns of working time in Europe over the last 35 years, with respect to three important aspects. The first is the interrelation between the dynamics of total working time and per capita working time in determining the dynamics of employment. It shows that, on the one hand, if total working time is given, shortening working hours is a necessary condition for an increase in employment, but the increase in hourly labour cost that it carries with it may reduce the total working time required. On the other hand, if more free time leads to an increasing time spent on some activities, especially connected to services (be it leisure, education or health), then this may counteract the negative effect of a rise in labour cost, not to mention the increase in productivity brought about by a reorganization of work done in the process. One may think that there are few productivity gains of the sort to be gained by further reduction in working time (although the issue is more

open in the service sectors, where reorganization can spread out a lot of part-time jobs or take advantage of shorter full-time jobs to reorganize front-office activities if not the back-office division of labour). More promising, however, seem to be the opportunities presented by the uses of free time. Much depends in that case on the institutional framework and on the specific policies that each country will be able to launch. Policies so far have not been very imaginative and the focus on competitiveness has led to a too large focus on the cost effect of a reduction in working time. Very little has been said about the advantages and limits of an increase in non-working time. The idea that it will simply disappear into the sands of such inert occupations as watching TV is quite common, although this has been challenged, if only because of the attraction of the more interactive Internet. As we stress in Chapter 6, there is plenty of room for policies to stimulate productive uses of free time (for oneself and for the common good).

The fact that a good number of European countries favour clear improvements in urban life styles may even be considered as a comparative advantage. The potential for coordinated adjustments in time budgets is a central issue. The relative inertia, if not reluctance, to change them is in large part tied to the threat to low incomes presented by the evolution of labour markets. This is deeply counter-productive and cumulative processes in the form of incentive plans to get out of such traps should be initiated. Again, the evolution of labour markets under the spell of ICTs may help in that respect.

National systems of innovation, which form the second institutional perspective taken here, encompass a broad range of issues. In a way one could say that the concept aims to capture all the institutions that one way or the other contribute to improving and organizing the human resources in a country, in order to promote economic growth and welfare in societies where these resources have obviously become the central asset of development (a way to paraphrase what is currently qualified as knowledge-based economies). In that respect, these national systems shape the various aspects of labour supply discussed above. Not only does the concept stress similarities and divergences between countries but, as these systems are very much policy-oriented in essence, they help to question what kind of tools could be considered and which policy target to select.

Such advantages come clearly out of the contribution of Amable and Boyer in Chapter 14 of the present volume. The authors undertake to cluster scientific, technological, social and financial institutions in order to derive configurations of these institutions that can be interpreted in terms of some key principles of adjustment: the market, the social negotiation process, the leading role of large companies, or a complete set of public interventions. The diversity of systems of innovation within Europe emerges from this analysis as a potential problem for the cohesion of the Union and the effi-

ciency of European policy, whether in the area of science and technology or more broadly. At the microeconomic level, the institutional arrangements present in the different countries provide different sets of incentives to agents in terms of opportunism or trust, short-term or long-term planning horizons, flexibility and so on. Therefore, one may expect not only very different patterns of investment, types of specialization and forms of innovation, which is what is found, but also very different patterns of response to structural policy impulses.⁵ To give an example, a set of European research policy measures based on market arrangements is more likely to have strong responses in the market-based countries than in other countries. Or, to go one step further, a competition process based on price competitiveness is likely to be more detrimental to countries which have highly elaborated sets of non-market mechanisms. Conversely, large old-style European technological programmes may be of benefit mainly to the public institution-based model, to the detriment of other systems with different features. The challenge to any European policy is therefore to promote this institutional diversity, while creating more and more complementarity among economic specialization patterns of the individual countries.

From this perspective, one should not underestimate the impact of the European monetary integration process on the dynamism of innovation, as a method for reconciling dynamic efficiency and the preservation of an extended welfare system. Back in the 1970s, an economy that experienced an erosion of its competitiveness could always adjust the exchange rate. During the last two decades, the objective of stable exchange rates among European countries has been the target of various policy strategies, the most frequent being a movement towards an increase in labour market flexibility. But an unexpected currency crisis could always, within one day, erode the structural competitiveness built up by a country over a decade or more. The Amsterdam Treaty is clearly putting an end to such possibilities. If a pure defensive strategy in terms of wage reduction and slimming down of the welfare state is to be prevented, a strong and dynamic innovation policy has to be promoted, both at the national and European level.

This discussion on the importance of the coherence and dynamic efficiency of institutional arrangements points to another set of policy recommendations in addition to those aimed at industrial specialization. This is why a differentiated set of policy measures adapted to the particularities of the different systems of innovation may be more apt for the present European situation. One may object that such a differentiation would neglect the process of integration within Europe. It is true that EU scientific programmes and measures favouring human capital mobility have taken steps in the direction of a unified Europe, but the integration is stronger in the goods market and in the area of monetary policy, and this

has created, so far, few echoes in the institutional fields relevant to systems of innovation. There is no unified financial system for Europe, in spite of a very strong movement of financial liberalization. Besides, this pattern of unification towards a more financial market-based system may not be the improvement it is meant to be, particularly in terms of financial fragility and investment project-monitoring abilities.

Large European industrial and technological programmes have been, so far, more successful when they corresponded to a public action organized around some large projects than in the promotion of networking and more decentralized industrial and technological integration. But this problem is not specific to the Union and is present at the national level too. This is more a matter of adapting public policies to changes in the forms of innovation and technological competition, at whatever level, than a strictly European problem. The lack of coordination between member states and their respective policies may exacerbate the problem, but it did not create it.

However, the most telling examples of institutional changes that have been implemented following a policy programme are given by the emergence of fully-fledged welfare states in the immediate postwar era. This brings us to the final point of this section. Obviously, these welfare systems have not been created overnight in the aftermath of the war. They are all rooted in the past history of each nation. How they took advantage of this past to develop new forms and how they are under strain in present times and have to reform themselves are crucial issues for the contemporary changes and their coordination at the European level. This context also strongly conditions the dynamics of employment in the sector of personal and community services. Mjøsset investigates in Chapter 15 the various forms taken by these welfare states in Europe. Esping-Andersen's (1990) tripartite typology of welfare states (Scandinavian, continental and southern European) is found to obfuscate central issues in the current context. For example, it does not help to distinguish between France and Germany, while the trajectories of these countries are obviously specific. Still such broad characterizations are useful. They broaden the range of 'ideal types' of welfare states to which we can refer to target global policies. A detailed comparison between the French and German welfare systems shows how different these systems are, especially if one wants to reform them. Policies will have to find precisely differentiated ways. Moreover, central issues in the evolution of the welfare state go beyond the changes in education and health provision systems, the changes in pensions systems and more generally all the changes accompanying an ageing of the European populations. This issue is clearly linked to those resulting from changes in participation rates. Projects on the future of societies are clearly as important as the drive to ensure the competitiveness of countries in defining the future structural policies of a unified Europe.

To conclude, it is clear that the old Taylorist organizational model, whether within the context of private firms or public administrations, within traditional manufacturing or services or within the organization of work or non-work activities, is undergoing a deep transformation. Organizational and institutional changes, as underlined in the various sections above, are an essentially man-made and policy-based feature of the technology, growth and job creation dynamics. While Europe, probably more than any other region in the world, has been characterized by major institutional changes, these institutional changes appear, we suggest in Chapter 16, to have by and large side-stepped a lot of the issues raised above and in this book. The policy orientations to be drawn from our work should therefore aim to fill this gap and propose measures which would alleviate, if not take advantage of, some of the diversities which have been so neglected in the process of European integration. But that is a task, and subject, we leave to the similar diversity of European, national and regional policy makers.

NOTES

1. It might be argued that the debate about the more recent Asian miracle and the apparently small part technological change played in the rapid industrialization of the Asian NICs, as claimed by some more traditional growth economists (Young, 1995), is a modern, Asian version of the OECD productivity paradox story.
2. With some differing experiences for the Scandinavian countries at the turn of the 1990s.
3. Putty-clay meaning that, once work organization in terms of job skills is chosen by the firm, it cannot be altered.
4. The skill allocation model retained is part of a more general production structure that has an explicit vintage production structure (see Master, 1997, for more details).
5. One should recall at this stage that the 'old systems' may well have entered a phase of decline, as suggested by some of the project's contributions that diagnosed decreasing returns of global R&D expenditures in the 1980s and onwards; see Chapters 2 and 5, for example.

BIBLIOGRAPHY

- Clark, J., C. Freeman and L. Soete (1982), *Unemployment and Technical Innovation*, London: Frances Pinter.
- Cornwall, J. (1977), *Modern Capitalism: its Growth and Transformation*, London: Martin Robertson.
- Elfring, T. (1989), 'Evidence on the Expansion of Service Employment in Advanced Economies', *Review of Income and Wealth*, 35(4), December.
- Englander, S. and A. Mittelstadt (1988), 'La productivité totale des facteurs: aspects macro-économiques et structurels de son ralentissement', *Revue Economique de l'OCDE*, 10, Paris.
- Esping-Andersen, G. (1990), *The Three Worlds of Welfare Capitalism*, Cambridge: Cambridge University Press.

- Fagerberg, J. and B. Verspagen (1999), 'Modern Capitalism in the 1970s and 1980s', in M. Setterfield (ed.), *Growth, Employment and Inflation*, London: Macmillan.
- Fagerberg J., P. Guerrieri and B. Verspagen (eds) (1999), *The Economic Challenge for Europe: Adapting to Innovation-based Growth*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.
- Freeman, C. and L. Soete (eds) (1987), *Technical Change and Full Employment*, Oxford: Basil Blackwell.
- Gordon, R. (1999), 'Has the New Economy Rendered the Productivity Slowdown Obsolete?', Working paper, North Western University, May.
- Griliches, Z. (1994), 'Productivity, R&D and the Data Constraint', *American Economic Review*, 84(1), 1-23.
- Litan, R.E. and W.A. Niskanen (1998), *Going Digital*, Washington, DC: Brookings Institution Press.
- McCombie, J.S.L. and A.P. Thirlwall (1994), *Economic Growth and the Balance of Payments Constraint*, London: Macmillan.
- MASTER (1997), 'Final Report to the Commission of the EC', MERIT, Maastricht.
- OECD (1997), *Employment Outlook*, Paris.
- Petit, P. (1986), *Slow Growth and the Service Economy*, London: Frances Pinter.
- Petit, P. and L. Soete (1997), 'Is a Biased Technological Change Fuelling Dualism?', working paper, CEPREMAP, Paris, December.
- Setterfield, M. (ed.) (1999), *Growth, Employment and Inflation*, London: Macmillan.
- Soete, L. (1987), 'Employment, Unemployment and Technical Change: A Review of the Economic Debate', in C. Freeman and L. Soete (eds), *Technical Change and Full Employment*, Oxford: Basil Blackwell.
- Young, A. (1928), 'Increasing Returns', *Economic Journal*, December.
- Young, A. (1995), 'The Tyranny of Numbers: Confronting the Statistical Realities of the East Asian Growth Experience', *Quarterly Journal of Economics*, 110(3), August, 641-68.